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Plata by Sebastian Cabot—and of the discovery by Cordova of Cape Catoche and Campeachy in 1517; but not of the discoveries of Magellan, who sailed in 1519 and returned in 1522; nor of Cortes, who discovered Mexico in 1519; nor of Pizarro, who left the infant colony of Panama on his expedition for Peru in 1524.

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VII.—*Observations upon M. d'Abbadie's Account of his Discovery of the Sources of the White Nile, and upon certain Objections and Statements in relation thereto, by Dr. Beke.* By FREDERICK AYRTON, Esq., F.R.G.S., and Member of the Geographical Society of Paris. Abridged.

[Read January 24th and February 14th.]

“CAPUT Nili quærere” has so long been accepted as a phrase significant of the futility of attempts to discover the sources of the famous river of Egypt, that, perhaps, one ought not to be surprised that a sudden announcement of success, even though professing to be founded upon the positive testimony of personal observation, should be met by incredulousness. Nor is it astonishing that ancient hypothesis, resting on conjecture (which, if experience had failed to confirm, it had equally failed to contradict), should still find an advocate unwilling, on the first summons, to surrender its easily enjoyed speculative conclusions to the stubborn dominion of facts; although these facts are broad and plain, and supported in their credibility by the ready manner in which they range by the side of collateral data, and reconcile the jarring opinions which have prevailed upon this key-stone of African geography from the time of Ptolemy Claudius, who first essayed to fix it definitively, to that of M. d'Abbadie's having announced his final discovery of its true position. But the question, as is well known, had an interest long anterior to the time of Ptolemy the geographer: Sesostris, Cambyses, Alexander, Ptolemy Philadelphus, Cæsar, Nero, and not a few besides, who have sought to leave for the chaplet of their future fame a record of their discovery of the sources of the Nile, have failed in attaining this object of their ambition. For thirty centuries had men set themselves in vain to solve this great geographical problem; and what neither the authority of kings nor the researches of philosophers could previously effect, two private travellers, aided by no influence, by nought save their own personal means, intelligence, patience, perseverance, untiring energy and enterprise, have at last accomplished.

Such were my impressions upon first learning the great dis-

covery made, after nine long years of toil, danger, and privation for its purpose, by the MM. d'Abbadie.

It will be recollected that some fifty individuals have, within the last ten years, appeared as rivals in the field for the same ultimate purpose of discovery with the MM. d'Abbadie. But all, save the MM. d'Abbadie, have failed in the enterprise. From various causes their competitors have found themselves stopped at the first Nile, unable to push their researches beyond it, into the very regions where alone they could hope to profit by personal observation of the circumstances they wished to elucidate. Nor have the MM. d'Abbadie, as suggested, to thank the kindred sympathy of European nations, and their scientific bodies, for the influence which has enabled them to traverse in safety regions which have scared from their face other travellers, who were doomed to stay their course at the hither boundary of the ground where the palm of victory was to be contested. England sent her mission—France her emissaries—both alike returned disappointed. The veil of Isis was not to be removed at the bidding of suitors, who, foregoing their own account, pleaded for nations, which, once foremost in contention to despoil her fanes, now only sought to make her presence the subject of their renewed rivalry, and not till she was approached by an admirer whose devotion to her cause for nine years bespoke the truth of his passion, did she deign to unfold the mystery of her tears.

To pass from metaphor to reality—what is the substance of the discoveries announced by the MM. d'Abbadie, and how have they compassed those discoveries, that their announcement of each step of their progress should have been made the subject of suspicious scrutiny, and a cause for attributing to them, in the outset of their undertaking, motives wholly foreign to its ostensible purpose? In reference to these questions, I propose to examine the nature of the MM. d'Abbadie's discoveries, the objections which have been urged to those discoveries, and the evidence by which they are supported.

To consider, then, the sufficiency of M. d'Abbadie's opinion, as contested by Dr. Beke, of his having discovered the true source of the Nile—the Nilus of the ancients, the Bahr el Abyadh of the Arabs, and the White Nile of European writers,—I conceive the case between M. d'Abbadie and Dr. Beke to stand thus:—

M. d'Abbadie concludes from his researches, while he was at Saka, into the geography of Inarya and the circumjacent districts, that the main stream of the White Nile is formed by the union of the several primary and confluent rivers which he has enumerated (*Bulletin de la Société Géographique, January 1845; Athenæum, Nos. 906 and 1041*) as having their sources in the irregular basin

formed within the mountains of Inarya, which, on the N. and E., separate the waters of this basin from those which fall into the Blue Nile and Hawash, or run towards the Gulf of Aden, and, on the S. and E., from those which, disemboguing on the E. coast of Africa, fall into the Indian Ocean.

A part of this mountainous tract to the S.W. of Saka, M. d'Abbadie alleges to be called Gamaro or Gimiro, whence he derives the Arabic appellation for the same mountains, of Gebel el Qamar, el Qomr, or Qomri, signifying, in either form of the last word, "Mountains of the Moon."

He then urges that, as the question of which of the confluent rivers shall be held to constitute the first course of the White Nile, has never been determined by general local consent, he is entitled, in tracing upwards the course of the White Nile, amid its successive confluent, to select between any two or more of them, when they meet, that one, for the main stream of the White Nile, which contributes, to the immediately confluent stream, the largest volume of water, and most nearly coincides with it in direction; and, proceeding upon this principle, he states, from personal observation and the most careful inquiry, extending even to the deputing two men specially to visit the rivers Gibe of Lega and Gibe of Inarya, near their confluence, in order to ascertain their relative magnitudes, that the Gibe of Inarya, which flows to the N. of the Gojeb of the same province, is to be taken as concurrent with the upper course of the White Nile; and that, again, the Bora, which is the principal tributary of the Inarya Gibe, is the actual commencement of the White Nile; and that, consequently, the source of the Bora, which M. d'Abbadie, from astronomical observations made by him at Saka, computes to be in  $7^{\circ} 49' 48''$  N. latitude and in  $36^{\circ} 2' 39''$  ( $34^{\circ} 42' 24''$  E. of Paris) longitude E. of Greenwich, is the source of the White Nile.

As directly opposed to the preceding views of M. d'Abbadie, Dr. Beke contends, upon the authority of oral information afforded to M. d'Arnaud, who, in charge of an expedition sent in 1842 by Mahommed Ali, Viceroy of Egypt, for the purpose of exploring the White Nile, ascended its stream to a point in  $4^{\circ} 42' 42''$  N. and  $31^{\circ} 38\frac{1}{4}'$  E. ( $29^{\circ} 18'$  E. of Paris), that the direct stream of the White Nile continued to ascend for one month's journey from that point in a southerly direction, that the true source of the White Nile is to be sought for in the country of Mono Moezi, which, according to Dr. Beke's deductions, based upon certain observations by Mr. Cooley in his 'Essays upon the Geography of the N'yassi,' published in the 15th and 16th vols. of the Journal of the Royal Geographical Society, lies to the S. of the 2nd degree of S. latitude, and between the 29th and 34th degrees of E. longitude.

The Gibe and Gojeb of M. d'Abbadie, and the Shooa-berri of M. d'Arnaud (receiving into their streams the whole of the rivers from Inarya and Kaffa, which flow to the White Nile), are by Dr. Beke assumed to be, the two first, after their confluence in their lower course, identical with the Saubat of M. d'Arnaud, which joins the White Nile on its eastern bank in latitude  $9^{\circ} 11' N.$  and longitude  $30^{\circ} 34' E.$ , and the last a tributary joining the White Nile, yet extending much further S.

Dr. Beke has referred (Athen., No. 1044) to his 'Essay on the Geography of the Nile,' published in the 17th volume of the Journal of the Royal Geographical Society, in which (p. 70), in the course of explaining the errors into which the Portuguese and Spanish writers of the 16th and 17th centuries fell in their attempted identification of the easternmost of the rivers which fall into the Blue Nile, or Nile of Abessinia, with the Nilus of Ptolemy, the conclusion is involved, that the lake of Zambezi (of the Portuguese), situate in the country of Mono Moezi, is the easternmost of the two lakes, which, according to Ptolemy, lie respectively in the course of two rivers that subsequently unite to form the Nilus. The source of these two rivers is said by Ptolemy (lib. iv. c. 9) to be in the Mountains of the Moon; and as the word "moezi," according to Dr. Beke, signifies, in a large class of the languages of Africa, "moon," he infers that the same word supplied a derivation for the Mountains of the Moon of Ptolemy.

Dr. Beke likewise advances against M. d'Abbadie, that upon his first visit to Inarya, in 1844, he asserted that the Gojeb, and not the Gibe, was to be regarded as the origin of the White Nile, and as he does not allow M. d'Abbadie any credit for a sufficient cause for having changed his opinion in favour of the Gibe upon his second visit in 1846, he would appear to suggest that the discrepancy should militate against the sufficiency of M. d'Abbadie's conclusions on both occasions.

Now it will readily be seen that the material issue between Dr. Beke and M. d'Abbadie is not whether this or that river in Inarya, or elsewhere, is to be regarded as the source of the White Nile, but whether the system of waters of the Nile is actually confined to Abessinia; Inarya with the immediately circumjacent districts, which have been assumed by M. d'Abbadie to supply the whole drainage for the upper course of the White Nile; and a tract, comparatively unimportant in respect of the volume of waters supplied by it, to the W. of its course, northward of the point reached by M. d'Arnaud; or whether we are to assign to the Nile a far more extensive system of drainage, and extend its waters into a country to the S. of the 2nd degree of S. latitude.

According to M. d'Abbadie's views, the two Niles S. of their confluence at Khartoum (in  $15^{\circ} 37' 10'' N.$ ) have a relation to

each other very analogous to that subsisting between the Euphrates and the Tigris. In both cases similar formations of mountains and incidents of climate may be supposed to produce on the opposite sides of a culminating ridge two systems of river drainage, of which the rivers of the outer system, that is, the White Nile and the Euphrates, collecting their waters from the larger extent of country lying on the outer side of the curve, and exposed to the earlier effects of the general winds which bring rain, or its equivalent snow, will be larger than the inner rivers, that is, the Blue Nile and the Tigris, which derive their drainage from the lesser space of ground on the inner side of the curve and to the leeward of the culminating ridge.

Dr. Beke's views in the case of the Niles do not admit of this comparison, inasmuch as, by carrying the main stream of the White Nile to an origin far S., and remote from the same mountainous region which on its northern or inner declination transmits its waters to the Blue Nile, the opposite or outer declination of this region is made but of secondary importance to the system of waters of the White Nile; and he must suppose that there is an uninterrupted connection by ascending valleys, through which the main stream of the western or White Nile extends, to a part of Africa to the S. of the 2nd degree of S. latitude, and between the 29th and 34th degrees of E. longitude; whence it would follow that, instead of the mountains of Inarya and Kaffa, in from 10° to 5° of N. latitude, and from 35° to 40° of E. longitude, constituting the point of culmination of the eastern part of Africa, we are to look for the culminating point of this part of the continent in from 29° to 34° of E. longitude, and to the S. of the 2nd degree of S. latitude.

On the right solution of this question will necessarily depend, to a considerable extent, the correctness of our ideas of the physical geography of Africa. In the absence of primary data it is, of course, impossible to do more than recur to those of a secondary order for its elucidation; and as the conclusions to be deduced in this state of our information will involve general rather than minute topographical facts, I propose, without going into local detail (a knowledge of which may be readily acquired by consulting the valuable papers by Dr. Beke and M. d'Abbadie already alluded to), to notice a few leading circumstances, which, so far as they bear upon the general grounds on which I have ventured to put the question, seem to me to direct opinion in favour of M. d'Abbadie; and I do this not without some hesitation, since I fully accord to Dr. Beke's opinions upon the geography of the Nile, the consideration and importance to which his indefatigable researches, physical as well as mental, into that subject, so well entitle them: but then I must not forget that

M. d'Abbadie's conclusions are the fruit of nine years' investigation on the spot, aided by great qualifications for his purpose.

To take the objections by Dr. Beke in the reverse order in which I have cited them, I may first observe, that the discrepancy between M. d'Abbadie's first assumption of the Gojeb being the source of the Nile, and his subsequent conclusion that the Gibe of Inarya is to be regarded as its true source, is, when viewed in its relation to the larger question of the geography of the basin of the Upper Nile, wholly unimportant. The source of the principal affluent of the Gibe is, as now computed by M. d'Abbadie, not more than 30 miles N., and as many E., of the source of the Gojeb, according to his computation of the position of that source in 1844: it is therefore a mere question as to which of two contiguous valleys may supply the larger affluent to their lower united stream, and if either one or the other supplies the source of the White Nile, the discovery of them both must be held to include the discovery of the source of the White Nile.

In objecting to M. d'Abbadie's derivation of *Gebel el Qamar*, or *Qomr* from the name, *Gamaro* or *Gimiro*, of the country, I cannot think that Dr. Beke has in any degree weakened M. d'Abbadie's hypothesis, by advancing that the derivation to Ptolemy and the Arabian geographers of the name of the mountains whence the Nile has its source, is to be sought for in the word "*Moezi*," because that word is alleged to signify Moon in some of the languages of Africa, and there happens to be a country of that name, to the south of the line, more nearly corresponding than *Gamaro* with the position assigned by Ptolemy to his *Σεληνης Ορος*.

The positions in *Æthiopia* recorded by Ptolemy cannot thus be made use of singly and independently of each other, when endeavouring to show the applicability of a particular position of Ptolemy to some particular place. The errors in his latitudes and longitudes are too great to admit of that simple method of using his authority. Thus the latitudes and longitudes, as given by Ptolemy (lib. iv. c. 8, 9), of the junction of the Nilus and Astaboras (White and Blue Nile), of the *Coloë Palus* (*Dembea Lake*), and of the *Lunæ Montes*, are, reckoning the longitudes from the meridian of the island of Ferro—

Junction of Nilus and Astaboras . . . . .	12° N., 61° E.
Coloë Palus . . . . .	0 69 E.
Lunæ Montes . . . . .	12½° S., 57° to 67° E.

The true latitudes and longitudes of the junction of the rivers, and of the lake, reckoning the longitudes from the same meridian, are—

Junction of Nilus and Astaboras . . . . .	15° 37' N., 50° 47½' E.
Coloë Palus . . . . .	12 0 N., 55 30 E.

So that Ptolemy placed the junction of the two rivers  $3\frac{1}{2}^{\circ}$  too far south, and  $13^{\circ}$  too far east.

Even were we to make the corrections in Ptolemy's latitudes and longitudes due to his having taken a degree of a great circle of the earth at 500 instead of 600 stadia,\* we should still fail to reconcile many of his positions with truth, or relieve them of the errors springing, as Dean Vincent observes, from his vague method of calculating distances, by the estimate of travellers and merchants, and the number of days employed in their journeys by land or voyages by sea. In some instances of places which may be supposed to have been more familiarly known than others to Ptolemy, a retrenchment, in the proportion of 600 to 500, will eliminate much of the error of longitude; as in the case of Alexandria, where a deduction of one-sixth from Ptolemy's longitude of  $60\frac{1}{2}^{\circ}$  would leave  $50\frac{1}{2}^{\circ}$ , which is only about  $2\frac{1}{2}^{\circ}$  too far to the E. of Ferro. But his latitudes are in many cases more irreconcilable than his longitudes. Alexandria and Syene are placed by Ptolemy in  $31^{\circ}$  N. and  $23^{\circ} 50'$  N., only a few miles to the S. of their true positions of  $31^{\circ} 11'$  N. and  $24^{\circ} 8'$  N., which shows that the latitudes of those two places were probably determined from observed altitudes of the pole, without reliance upon the estimated distance between them. Below Syene, however, towards the interior, where estimated distance must have been resorted to, the errors gradually increase, until the Coloë Palus (Dembea Lake) is made to be  $24^{\circ}$ , instead of  $12^{\circ}$ , to the S. of that place; and proceeding in the same way, why may not Ptolemy have placed the Lunæ Montes  $16^{\circ}$  or  $17^{\circ}$  too far S.? That quantity, applied as a correction to his latitude, would make it very well agree with the position of the Gamaro mountains about the sources of the Gojeb and Gibe; since if, to M. d'Abbadie's longitude of  $36^{\circ} 2' 39''$  E. for the source of the latter river, we add  $18^{\circ} 9' 45''$ , the longitude of the island of Ferro W. of Greenwich, we have  $54^{\circ} 12\frac{1}{2}'$  nearly, which falls sufficiently between  $47\frac{1}{2}^{\circ}$  and  $56^{\circ} 50'$ , the longitudes of the western and eastern limits of the Lunæ Montes (after deducting one-sixth from  $57^{\circ}$  and  $67^{\circ}$ , the number of degrees assigned by Ptolemy to their limits, as stated above) to warrant us, when taken in conjunction with the correction which may be applied to his latitude, in deciding, so far as Ptolemy's position affords an indication rather in favour of the identity of the Lunæ Montes with the mountains of Inarya, than with any which may exist in the country of Mono Moezi.

To return to the derivation of Gebel el Qamar: it has been upon another occasion observed by Dr. Beke, that if M. d'Abbadie's derivation were correct, how could Ptolemy have derived the

\* M. de la Rochette on the first Meridian of Ptolemy, in Dean Vincent's 'Commerce and Navigation of the Ancients,' vol. i. p. 567; also vol. ii. p. 612.



sense of "mountains of the moon" from the word *Gamaro*? This objection must imply that the Arabian geographers translated their appellation of *Gebel el Qamar* from the Greek; otherwise it would be a sufficient answer to allege, that there is nothing to raise even a suggestion that Ptolemy derived his sense of Moon in the name of these mountains from the word "*Moezi*." It cannot be categorically proved that the Arabians did not, in this as in other instances, translate from the Greeks; but various considerations may be adduced which seem to render more probable that the Greeks were indebted to the early Arabs for their geographical nomenclature of the north-eastern part of Africa, than that the nomenclature of that region transmitted to us by the Greeks was first discovered and made known to the rest of mankind by themselves.

These considerations are founded upon the fact of the Arabs having been the earliest navigators of the Red Sea and Indian Ocean—upon the extent of the intercourse which history suggests as having existed in early times between Arabia and *Æthiopia*—the application consequent to that intercourse of the language of the Arabs in *Abessinia*—the circumstances under which, upon the accession of the Ptolemies to Egypt, the immediate trade between that country and the Red Sea was acquired from the Arabs by the Greeks, and afterwards continued by them under the Roman domination of Egypt—and lastly, the channels incidental to that commerce, through which the Alexandrian geographers may be supposed to have derived their knowledge of north-eastern Africa. As these topics are of sufficient interest to bear an examination a little in detail, I shall endeavour to set out in order the observations in respect of them that have occurred to me, and thence to deduce what was the course of information to Ptolemy of the geography of that part of Africa which includes the mountains where the Nile was reputed to rise, of those mountains themselves, and of their name.

That the Arabs, Dean Vincent has observed (*Periplus*, vol. ii. p. 2), were the first navigators of the Indian Ocean, and the first carriers of Indian produce, is evident from all history, as far as history goes back; and, antecedent to history, from analogy, from necessity, and from local situation: and we may conclude that then, as now, the same circumstances threw likewise into their hands the principal trade of the Red Sea and of the coast of Africa beyond it.

Of the intercourse of the early Arabs with the interior of *Abessinia*, history affords but few and scanty notices; nevertheless these notices point to circumstances of a sufficiently large operation to raise the inference that that intercourse brought them acquainted with all parts of *Abessinia* long anterior to the era of the Greeks in Egypt.

It has been maintained by Ludolf, upon the authority of Procopius of Gaza, Stephanus, and an Arabic writer cited by him under the name of Uranius, and by Scaliger (in Dean Vincent, *Periplus*, vol. ii. p. 110), that the Abessinians are of Arabian origin. Ludolph says (*History of Æthiopia*, lib. i. c. 1) that they were formerly reckoned into the number of the Sabæans and Hamyarites, and adduces as arguments in proof of this origin the similarity of their customs and physical conformation, and the near affinity of the Æthiopic and Arabic languages, a harmony of which he has appended to his *Æthiopic Lexicon* (2nd edit. 1699). Dean Vincent, on the other hand (vol. ii. p. 107, *et seq.*), finds ground, in the account given by Herodotus (lib. 2, c. 30) of the defection of the 240,000 Egyptians, who quitted the government of Psammeticus and migrated into a country 57 days' march beyond Meroë, for supposing the Abessinians to be of Egyptian origin. But this conclusion of Dean Vincent is somewhat overborne by the subsequent testimony of Herodotus himself, in the 104th chapter of the same book, where he alludes to both the Egyptians and Æthiopians as having existed from time immemorial. Dean Vincent considers the mixture of Arabic in the language of the Abessinians to be accounted for from their constant communication with Arabia in the earliest ages; and still more, from the common origin of language in Egypt and the adjoining countries.

Without venturing to determine whether or not the Abessinians were descended from Sabæan tribes, who in early times migrated into Abessinia, there is reason to conclude that successful irruptions of the Sabæans into that country at some remote period took place. Pococke (*Specimen Historiæ Arabum*, edit. 1806, p. 60) cites, on the authority of Abu-l-Feda, El Jannabi, and Ahmed-ibn-Yusuf, the eighteenth king of Yemen after Kahtan (Joctan of the Scriptures), by name Afrikús, as having given his name to Africa; and the twenty-third king, by name Nashero-l-Ne'am, and the successor to Balkis, alleged to have been the Queen of Sheba who visited Solomon, and who is in like manner mentioned by M. Marcel,\* on the authority of the Arabian geographer, Nour-el-Baqúi, as having made considerable conquests westward in Africa. El Baquí is also stated by M. Marcel to add, that the Sabæan dominion embraced Egypt and the adjacent countries, and that the people of Nubia had in his time, which was about the year 1400 A.D., resident at Dongolah, a king said by them to be descended from the ancient Hamyarites; and Bruce, whose account is confirmed by MM. d'Arnaud and Thibout (*Bulletin de la Société Geogr.*, Nov. 1842, p. 381, and Feb. 1843, p. 93),

\* 'Mémoire sur les inscriptions, &c. dans la description de l'Égypte,' vol. xv. p. 14. Edit. 8vo.

observed traces of the Sabæan worship of the moon among the Shillooks and Dinkas, on the banks of the White Nile, not far above its junction with the Abessinian Nile, so late as the last century. Concurrent with the testimony of the Arabian historians we have that of Herodotus, who states (lib. ii. c. 100 et 140) that Egypt was twice ruled by Æthiopian kings; firstly, by eighteen, in the period of the three hundred and thirty generations which prevailed between Menes and Mœris; and secondly, in which he is more particularly confirmed by Diodorus Siculus (lib. i. c. 65), by an Æthiopian king of the name of Sabakos, who governed the country for fifty years and then retired again into Æthiopia. Sabakos, however, according to the collation of Berosus in Josephus (lib. xl. c. 1), was only the first of three Æthiopian kings who ruled over Egypt during forty years of the period assigned by Herodotus and Diodorus to Sabakos alone. Of this last Æthiopian rule we have the further particular from Herodotus of its having been the second in order before that of Sethon, with whom Herodotus states (l. ii. c. 141) Sennacherib made war, which would make Sethon the same with Tirhakah the Æthiopian, mentioned in the 2nd Book of Kings (c. 19), and by Isaiah (c. 37), and the æra of Sennacherib, which was from 713 to 712 B.C., coincident with part of the reign of Sethon. Sethon was preceded by Anysis, who had been previously dispossessed of the kingdom by the Æthiopians, and could not, upon his restoration, therefore, after the long interval of the Æthiopian dominion, have reigned more than a few years: consequently either Anysis or Sabakos, or the last of the two successors of Sabakos, if there were three Æthiopian kings, must have been the same with the King of Egypt mentioned in the 2nd Book of Kings (c. 17) as So, who conspired with Hosea, king of Israel, against Shalmaneser, the predecessor of Sennacherib in Assyria, about the year 722 B.C.; and the second Æthiopian reign in Egypt would date from about the year 770 or 760 B.C. to the year 720 B.C. This date, then, is too much posterior to that of the kings of Yemen, stated to have invaded Æthiopia, to admit of any supposition of identity between them and the Æthiopians of the second Æthiopian dynasty in Egypt; and as there is no mention of later conquests by the Sabæans in Æthiopia, we must recur to earlier events in Egypt, on which, faint as the light of history falls, it yet affords some gleams by which we may venture to discern the presence, in Æthiopia, Nubia, and Egypt, of a king of Yemen.

It has been stated that Nashero-l-Ne'am, the twenty-third king of Yemen, succeeded the Queen Balkis, alleged to have reigned over Yemen in the time of Solomon, who ruled over Israel and Judah from the year 1015 B.C. to the year 976 B.C. This date, if we allow for the duration of the reigns of Queen

Balkis and of Nashero-l-Ne'am sixty years, which may be done without violence to probability, would place the termination of the reign of Nashero-l-Ne'am in the year 916 B.C., which would very well reconcile his conquest of Æthiopia and Egypt with the era of Zerah the Æthiopian, mentioned in the 2nd Book of Chronicles (c. xiv.) as having gone up against Asa, King of Judah, by whom he was vanquished and pursued to Gerar, in the direct road from Judæa to Egypt, about the year 922 B.C.

It must be acknowledged that the above coincidence does not harmonize with the subsequent series of rulers of Egypt given by Herodotus, but it is not on that account the less a coincidence as between the records of Scripture and those of Arabian history; and it receives additional support from the fact of the early invasions of Egypt referred to having been from the side of Æthiopia; for, in the absence of all historic notice of invasions of Egypt from any other quarter by early Arab tribes, it would necessarily follow, if the Sabæans extended their irruptions as far as Egypt, that they must have come through Æthiopia, which, again, they could only have accomplished by first securing for themselves a passage through Abessinia. There is, therefore (however little we may be able to define particular events), some concurrent historical evidence in favour of the general conclusion to be drawn from the Arabian writers, that the Sabæans did at one time invade and conquer Abessinia and the adjoining countries.

Ludolf's arguments, from the affinity of the language and customs of the Arabians and Æthiopians, for a common origin of the two people, may admit of qualification to the extent of supposing that affinity to be due to the dominion only of the Arabs over the whole or greater part of Abessinia in an early age. But beyond that, historical experience, from the very ground which he takes, does not warrant a rejection of his hypothesis. It is not merely the oral but literary, form of the Æthiopic which corresponds so closely with the ancient Arabic; the characters, even, in which the Æthiopic is written being, as observed by Mr. Bird in his description of some Hamyaric inscriptions found at Aden and Sana (Journal, Bombay Branch, Royal Asiatic Society, October, 1844), almost similar to those of the Hamyaric writing.

If we were to recur to Dean Vincent's suggestion of the common origin of language in Egypt and the adjacent countries for an explanation of the close affinity subsisting between the Arabic and Æthiopic, we might suppose that a still closer affinity would be discoverable between the Æthiopic and the languages spoken by the descendants of Cush, who peopled, besides Africa, Assyria, Mesopotamia, and Judæa; but whatever may have been the characteristics of the language originally spoken in Æthiopia, Ludolf expressly states (lib. i. c. 15) that the affinity between

the existing Æthiopic and the Chaldee, Syriac, and Hebrew, is remote, as compared with the closeness of its affinity to the Arabic.

Nor is Dean Vincent's argument of mere voluntary intercourse, if it is to be so understood, between the Æthiopians and Arabians sufficient wholly to account for the similarity of their languages. An intercourse between races of the same stock, such as existed between the descendants of Joktan and Peleg, of Isaac and Ish-mael, may furnish cause for lingual congruity, as of the Arabic with the Hebrew; but it may be suggested whether it would not be as reasonable to attribute the prevalence of Celtic in some of the languages of Western Europe to other than causes of former irruptions of the Celts into the districts where it is found to prevail, as to assume that the influence of Arabic upon the language of Æthiopia has not been the result of circumstances of conquest.

We are, therefore, if the above statements and arguments be consistent, justified, as well from incidents of language and of custom as of history, in supposing that the early Arabs of Yemen did, shortly after the time of Solomon, possess in dominion Abessinia. To what extent their conquests stretched cannot be known; but Ludolph, in enumerating the minor kingdoms formerly belonging to Abessinia (lib. i. c. 3), and therefore of people formerly under the same national influences, includes among them Inarya and Kaffa. Of these minor kingdoms, Inarya and Kaffa, and all others to the south of the Blue Nile, have been long since overrun by invading Galla tribes, whose language has kept pace with the progress of their encroachments.

In order to judge how far the assumed use of the language spoken by the Sabæan Arabs will account for the occurrence, from their time, of the particular word *Qamar* in the name of the mountains where the White Nile rises, it will be necessary to trace that word in connection with the general progress of the Arabic language.

Arabic historians (M. Marcel, *Mémoire*, &c., p. 142; Pococke, &c., p. 155) inform us that the ancient language of Arabia was divided into two principal dialects, which took their names from the two most considerable tribes by which they were used; the one was called, from the tribe of Hamyar, the Hamyaric dialect; and the other, from the tribe of Qoreish, the Qoreishite dialect.

The Hamyaric dialect, supposed to be by far the most ancient, was spoken by the tribes of Yemen descended from Joktan. As a distinct dialect, it has been superseded since the time of Mahomed, by the Qoreishite, and we only recognise some of its peculiarities through notices by more modern authors of words formerly belonging to it.

The Qoreishite dialect was common to the tribes descended from Ishmael, settled in the Hejaz to the N. of Yemen. It was considered to be the more pure dialect. The Koran was written in it; and it has thence become the current language wherever Arabic is spoken.

Although the two dialects have been described by Arabian writers as possessing idioms and terms peculiar to each, we do not find their difference asserted to be so great as to preclude their being considered to constitute, in their fundamental principles of construction and affinity, one language. Those writers themselves, in tracing the derivation and signification of obsolete Hamyaric words, frequently recur to the Qoreishite dialect for an explanation of their etymology (notes *passim* in Pococke); and Pococke adduces, as explanatory of the general character of the Hamyaric, that it approached more nearly to the Hebrew, Syriac, or Chaldee (p. 157), while it is well known that the Qoreishite, as it has descended to us in the later Arabic, is likewise cognate with the same tongues. That many words and phrases should have prevailed in one part of Arabia which were not recognisable by the inhabitants of another part, is not surprising, when we reflect upon how multiplied must have been the sources of vocables to a language which has accumulated (Pococke, &c. p. 158) two hundred synonyms for the name of a serpent, five hundred for that of a lion, eight hundred of honey, and in which one thousand yet leave unenumerated expressions for a sword. But notwithstanding this immense variety of terms, every word in sound and structure conforms to the law of a single language, and evinces thereby that it has been, wherever locally originated, produced in affiliation to a pre-existing parent stock.

However certain it may be that some words of equivalent meaning in the two dialects differed, it is equally certain that others were common to both, and from the nature of language this last class of words would include more generally the names of objects, of which the distinctive qualities known to the speaker were fewest in suggesting attributive synonyms. Such objects would be the heavenly bodies, and those large and individual appearances in nature which great divisions of the human race have been found by common consent, as it were, to designate through succeeding ages by the same specific names. Of the latter kind of such objects, again, mountains, rivers, individual localities, as cities, tracts, and countries, furnish examples; and of the former kind the name of the "sun," which there is every reason to conclude was "Shums" from time immemorial throughout Arabia; since the N.E. peak of the central ridge, about 1600 feet high, of the peninsula of Aden, the sea-port of Saba, the ancient capital of the tribe of Hamyar, who worshipped the sun

(Pococke, &c. p. 5), is still called "Gebel Shumsan," or "mountain of the sun," marking thereby the Sabæan use of the word "Shums." In Hebrew and Syriac the sun is likewise expressed by "Shums."

Although the worship of the heavenly bodies was very general in Arabia (Sale, *Koran*, Preliminary Discourse, p. 17, ed. 1734), and even spread thence to Samaria in the time of Hosea (2 Kings, c. 17), but few of their Sabæan names have been transmitted to us, and of these the name of the moon is unfortunately not of the number. It is only, therefore, by inference, on the principle above ventured to be set forth, that we can assume the principal name for the moon to have been constant with the whole of the Arabs. That name, as it relates to the subject of this inquiry, would be *Qamar*, which is the word used repeatedly to designate the moon in the *Koran*, now written more than twelve hundred years ago. As used in the *Koran*, written also for wide circulation, the word *Qamar* must have been then well established; and of a word of this peculiar kind found in the *Koran*, it may fairly be asked, what may not be supposed to have been its previous antiquity? The learned Sale has said (Preliminary Discourse, p. 25) that "the Arabic language is undoubtedly one of the most ancient in the world."

Why the Arabs, upon their first acquaintance with Æthiopian topography, should have applied this specific name to the mountains where the Nile was reputed to rise, can only at this distance of time be matter of conjecture; but that conjecture stands in juxtaposition with other circumstances, which impart to it as much of consistency as is necessary for the present argument.

That conjecture is, either that the Arabs supplanted the original Æthiopic name of these mountains by one derived from a Sabæan source, and that the present local words *Gamaro* or *Gimiro* are but corruptions of the Sabæan appellative *Qamar*, or if *Gamaro* or *Gimiro* be regarded as the original Æthiopic name of the mountains, that the appellative *Qamar*, from the consonance of its radical letters with those of *Gamaro* or *Gimiro*, may have been applied as an equivalent, and become generally substituted for those words among all traders, to whom Arabic, as the language of commerce of those parts, was known.

In support of the first hypothesis it is to be noted, that from the moon constituting an object of Sabæan worship (Pococke, p. 5), it is as probable that mountains should have been named after it as after the sun, an instance of which has been already given. Accordingly, the *Gebel el Qamar* of Africa are not the only mountains known to the Arabs by the name of *Qamar*. In *Hadbramôt*, a province of Arabia to the N.E. of Yemen, between the towns of *Sherma* and *Merbath*, is a mountain named

Gebel el Qamar (D'Herbelot, Bib. Orient. in v. Comar), and the cape at the southern extremity of the peninsula of India, called by Europeans "Cormorin," is likewise named by the Arabs Qamar or Qomr (*idem* in v. Comar). It would, therefore, not be surprising if the early Arabs had applied a similar designation to African mountains.

In support of the second hypothesis, it is a curious coincidence that a chief signification given by Ludolf (Lexicon, &c.) of the Æthiopic word Qamre (spelt with qof, mai, rees) is fornix, camera; and by Castell (Lexicon Heptaglotton), fornicis instar ædificatum; and that a further signification by Ludolf, from the use of the same word in a book called 'Magic Prayers,' is "Sphæræ planetarum, in specie lunæ." The only word approaching Qamar in the Coptic is Gom or Jom (spelt with gangia, ou, mi) signifying (Peyron, Lexicon) vis, robur, potentia, which is in affinity with the idea of the mass and firmness of a mountain, as fornix, &c. is with the form of it. There are, therefore, some slight grounds for assuming that Qamre may have been an original term in some Æthiopic dialect to express the idea of mountain, or that it may have been an original Æthiopic designation for the mountainous tract which now bears the name of Gamaro or Gimiro; and it cannot be unreasonable to assume, that the early Arabs might have converted those words into their own homonymous word Qamar, or Qomr, or Qomri, while we find so respectable modern an authority as Malte Brun (Geogr. vol. ii. p. 215, Engl. ed.) talking of a high country in Yemen named "Gebel," and our navigators converting "Ras el *Fil*," meaning "Cape Elephant," and the same with the Mons Elephas of Ptolemy (lib. iv. c. vii.), into "Cape *Felix*" (Horsburg, Directory, &c., vol. i. p. 227, ed. 1826).

So far, then, the early intercourse of the Arabs with Abessinia has been regarded as sufficient to account for their knowledge and designation of the Abessinian Mountains of the Moon. Their subsequent intercourse with that country and with Egypt during the time of the Ptolemies and the Romans, and the derivation from them, in that period, of the sense of Mountains of the Moon, to the Greek geographers, is now to be considered.

After the accession of the Ptolemies to Egypt, the importance of the trade in the Red Sea soon began to attract their attention. Ptolemy Philadelphus, the second of the dynasty, founded at the head of the Heroopolitan Gulf the city of Arsinoë, which offered to the maritime trade on the east of Egypt a dépôt at the shortest possible distance from Alexandria, the great emporium of its Mediterranean commerce on the west; and finding afterwards that the north winds, which blow down the Red Sea for nine months in the year, opposed a dangerous obstacle to the



passage of merchandise in ships in its upper course, he built, to obviate that difficulty, and possibly at the same time to leave Palestine and Syria less independent of a traffic through Egypt, on the African shore, 400 miles to the south of Arsinoë, the port of Berenike, where the cargoes were unladen from the ships, and forwarded in twelve days by land to Coptos, in Lower Egypt; and then, again, with the view of still further benefiting the trade, he established the second port of Berenike, called also Ptolemais Theron, 350 miles (Capt. Moersby's Chart of the Red Sea) to the south of the first Berenike, and on the site, probably, where the Æthiopian traders had been accustomed to resort to meet the vessels from Arabia, when the trade came to Egypt through this part of Æthiopia (Pliny, in Sharpe's History of the Ptolemies, p. 73).

But it was in the succeeding reign of Ptolemy Euergetes, which commenced about 246 years before the birth of Christ, that the more extensive commerce of the Red Sea became appropriated by the Greeks. Towards the end of his reign Ptolemy Euergetes undertook an expedition to Adulis, the modern Maszawwah, whence he pushed his conquests along both shores of the Red Sea and on the African side, subjugated the sea-port states as far as Zingebur, and the countries inland as far as Shawa, a province to the south-east of the first Nile. The record of this expedition was preserved in the Adulitic inscription discovered by Cosmas in the year 525 of our æra, and 750 years after the visit of Ptolemy to Adulis (Cosmas, *Topographia Christiana*, in Dean Vincent, &c., vol. ii. p. 531 *et seq.*).

Although the more extended trade in the Red Sea must, pursuant to the measures of the first three Ptolemies, have passed to the Greeks, the local trade from port to port, and between Arabia and Africa, must still have remained, as it always has, with the Arabs, whose local situation and habits of life have ever qualified them, better than strangers, for intercourse with each other and with the adjacent tribes of Africa.

From similar circumstances in respect of the Abessinians and those with whom they traded inland, it may be affirmed that the Greeks did not participate in their inland trade between their southern provinces and the sea-coasts of the Red Sea and Gulf of Aden, which was most probably then carried on, as in the time of Cosmas (*idem* in Dean Vincent, &c., vol. ii. p. 541), and as at this day, by themselves.

Thus may it be presumed that the Greeks under the Ptolemies obtained no larger share in the commerce of the Red Sea than has fallen to the lot of others who have since commanded its navigation. The trade from distant places, as it affected Egypt, was in the hands of the Greeks. The local trade, between the neigh-

bouring ports of Arabia, and of Arabia and Africa, and the internal trade of Abessinia, was with the Arabs and Abessinians.

As the Greeks only entered into a navigation in the Red Sea already well established by the Arabs, they would naturally have derived their first knowledge of its incidental geography through Arabian information and an Arabian nomenclature; and whatever names had been applied to places in and about the Red Sea, by the Arabs, would come down to the Greeks with the Arabian stamp upon them unaltered.

There is no ground even for inferring that they could have acquired any knowledge of Abessinia, particularly of its southern provinces, except through the route of the Red Sea. The same natural difficulties which now preclude caravans from travelling from the countries about the sources of the Nile into Egypt, by land, must have operated with equal force, so long as nature has maintained in those parts the same aspect; and from the commencement of commerce, all information of the provinces of Abessinia would have travelled, first, from those provinces to the sea-coast, and thence, by the prevailing route of trade, into Egypt.

When the Romans succeeded the Ptolemies in Egypt, the trade in the Red Sea would still have maintained the same comparative relations, and the knowledge of the adjacent countries in Africa to the geographers of the Roman æra, would be but the progressive advancement of that already acquired by their predecessors under the Ptolemies.

Under the Roman dominion of Egypt, in the reigns of the Emperors Adrian and Antoninus, in the second century of the Christian era, lived Ptolemy the geographer. That he did not visit the places which he describes, to the south of Meroë, is to be inferred from his errors of latitude; it being not too much to affirm that the altitude of the pole, by which his observed latitudes were measured, might have been ascertained by mere mechanical contrivance within the reach of any ingenious mind, with more precision than his results evince. His knowledge, therefore, of the geography, with its nomenclature, of north-eastern Africa would have been derived through the works of preceding writers, and the common channel of information on the subject, to him and them, which the trade in the Red Sea, it has been shown, had so long kept open. This nomenclature, then, would have likewise reached him, as it was known to its first discoverers the Arabs, and, so far as it originated with them, would have been in terms of their language; and if they had already adopted for the mountains, where the Nile was reputed by them to rise, the name of Gebel el Qamar, the sense of these words would have been known to the Greeks through their communication with the Arabs, and have been rendered by the equivalent expression in Greek of *Σελήνης Ορος*.

Of what high antiquity are the names of many places in Arabia and the opposite part of Africa, may be seen by comparing the existing names of provinces and towns and tribes with those given in the earliest writings. In the Adulitic inscription, for instance, are mentioned, in Africa, Agame, Ava, Ath-Ágau (the Agows, near the sources of the Blue Nile), Samêné (Samen), Zaa (Shawa), At-Almo (Lam-Almon), Zingabéné (Zingebär), with others identified by Dean Vincent (vol. ii. p. 544 *et seq.*) from the names of the same places given by Bruce; in Arabia also Sabea. The name of the town of Aden in Arabia has existed from time immemorial; and the Arabian province of Hadharmôt still bears the name of the son of Joctan (Gen. xi.); the province of Irak, that by which it was designated in the time of Nimrod (Gen. x.), and the Arabian name of Egypt, "Misr," has been transmitted to us from that of Mizraim, the son of Ham (*idem*). Why then should it be assumed on any one ground that the "Gebel el Qamar," or "Mountains of the Moon," were not known to the Arabs long before they were heard of by the Greeks? Every presumption is against such a conclusion. The early history of the Arabs—their enterprising spirit—their prior navigation of the Red Sea—the extended use of their language—mark them to have been the first instructors of the Greeks in the geography of the regions on the shores of the Red Sea without the bounds of ancient Egypt.

The above considerations have been offered at length, because they involve, together with the early knowledge of a particular place to the Greeks, the origin of their acquaintance with the geography of a great part of Arabia and of north-eastern Africa. The priority claimed for the Arabs in these respects appears even in their name "Níl," for the Nile itself in its passage through Egypt; and a short digression to show the probability of their having derived that name from a source anterior in date to the use of the Greek word Νεῖλος or the Latin Nilus, may not be deemed too irrelevant for admission. Abd el Latýf (p. 191, White's ed.), who wrote his book on Egypt at the close of the twelfth century, and after him, Ferozabâdi, who died in 1414 A.D., states that the word Níl as an appellation for the river Nile is derived from the verb Nál, to bestow, to give, which with kesra under the nun in place of futha, and a yé in place of the alef, becomes the name of that which is given. According to Eratosthenes (in Jablonski, *Pantheon Ægyptiorum*, pars ii. p. 159) and Diodorus Siculus (lib. i. c. 63) the Νεῖλος was originally called Αἰγυπτος, and obtained its name of Νεῖλος after an early king of Egypt, who "greatly distinguished himself by constructing beneficial works in connection with the river," from which it would follow that the Greeks adopted their term of Νεῖλος from an Egyptian word. Jablonski (pars ii. p. 156) thinks that the name of the Nile is

derived from two Coptic words signifying "certo et determinato tempore adscendens." In some places in Scripture (2nd book of Kings, c. 24, v. 7, &c.) the Nile is denoted by the Hebrew word *Nehhl*, meaning primarily a narrow valley containing a stream, particularly which at certain periods overflows (Dr. Lee's Hebrew Lexicon; M. Marcel, *Mémoire sur le Meqias*, &c., Description de l'Egypte, vol. xv. p. 41), and having nearly a similar signification through the sister-dialects of the Chaldaic, Syriac, Samaritan, and Persian. Dr. Lee makes the Hebrew *Nehhl* cognate with the Arabic *Nahl*, which signifies a first draught with which camels, &c. are watered; but there is also an Arabic word *Nehhl*, signifying to bestow, and nearly synonymous with *Nál*. In all these words, and in the corresponding word in Æthiopic also, according to M. Marcel, there is a sufficient concurrence of the same radical letters, to render it extremely probable that some form of the present word *Níl* has been a name for the Nile with the Arabs from the commencement of their language, and that it is an offspring from an eastern root whence the name of the King *Νεῖλος* was also derived.

Whilst finally concluding these philological remarks, I would suggest whether the signification of the words *Mono Moezi* has any relation to the sense of *Moon*, and whether some clue to their meaning may not be deduced from the Coptic words *Moone* or *Mono*, signifying (Peyron, *Lexicon*) *mansio*, *habitatio*, also *portus*; and *mes gignere*, whence *mese generatus*, and *mesi*, *masi*, *pullus*. It is just possible that the compound *Mono Moezi* might imply people of the Port (of the lake *Zambezi*). M. Jomard (*Voyage à Tembaktú par René Caillié*, vol. iii. p. 525) suggests that the word *Tembaktú* includes the Berber article *ta*, which appears to resemble the feminine Coptic article  $\tau$ . It is, however, a subject not yet at all investigated how far the Æthiopic, Coptic, and Arabic may have entered into the general basis of African languages.

It now remains to submit a few reasons in connection with physical geography which have induced me to think that M. d'Abbadie is right in his conclusion that the *White Nile* rises in *Inarya*, and this I desire to do, it must be remembered, in reference only to the general ground on which I have essayed to put the question, in stating it to be one of whether the waters and consequently main sources of the *White Nile* are derived from *Inarya* and *Kaffa*, or whether the rivers formed by the waters of those districts are to be looked upon as tributary only, and secondary to the main stream of the *White Nile*, of which the principal origin is to be sought for to the south of the 2nd degree of south latitude.

If we regard, relatively, for the present purpose, the configura-

tion of Africa, we find that on the N.E. the Red Sea constitutes an axis of depression, on either side of which continuous mountain ranges have been thrown up parallel to its coasts; the one, on the E., in Arabia; the other, on the W., in Africa. The African range separates the valley of the Nile from the Red Sea, and is in no place broken down so as to admit of the passage of the waters of the Nile into the Red Sea. Towards the lower part of the Red Sea, and afterwards in the Gulf of Aden, where the shores of Africa and Arabia gradually recede from each other, until the easternmost point of Africa is attained and the shore of that continent turns abruptly round to the S. and W., the altitude of the mountains on either side rapidly increases, as if the forces which upheaved them, then becoming divergent, had also acted with more marked and distinct effect. On the Arabian side the range which there separates the Tehama, or low tract bordering the sea, from the upper country, cannot, as far as my observations at a distance enabled me to judge, be less than 5000 feet high. But notwithstanding that height, and that this part of Arabia is within the influence of the S.W. monsoon (Niebuhr, *Description de l'Arabie*, p. 3), no rain falls in the Tehama at the period of that monsoon, and the rain which then falls in the upper country is too scanty to suffice even for purposes of cultivation (*idem*, *Voyage*, vol. i. p. 326). On the African coast also, within the Red Sea, no rain falls at the time of the S.W. monsoon to the eastward of the African range (Bruce, *Travels, &c.* vol. iii. p. 65, 4to. edit.); while to the westward of the same range the S.W. monsoon prevails, with greater or less intensity, from the Indian Ocean to Nubia, being more regular over Abessinia and the mountainous regions to the south (Bruce, vol. iii., Ritter, vol. i. p. 222, and *Meteorological Tables*, vol. iv. p. 663), and interrupted in Darfour in long.  $28^{\circ} 8' E.$  and lat.  $14^{\circ} 11' N.$ , and in the districts W. of the White Nile (Browne, *Travels, &c.* pp. 234-254, and *Meteorological Tables*, p. 475). On the coast of Africa outside the Red Sea, in the Gulf of Aden, so much rain falls at the period of the S.W. monsoon as to prevent the passage of Kafilehs from the interior, and to cause the traders frequenting the entrepôt of Berberah then to disperse and seek a drier asylum till the return of fine weather in October, which rain is probably owing to the contiguity of that tract to the high southern part of the Abessinian plateau and Indian Ocean, and also to its own hilly nature.

Now, since the S.W. monsoon along the African coast takes a direction from S.S.W. to S. (oral information from Capt. Moresby, late superintendent of the survey of the Red Sea), and the high mountains of the Abessinian plateau, including Kaffa and Inarya, intercept the rain of the S.W. monsoon in what would otherwise be its passage across them to the mountains of Yemen, in

Arabia, it is clear that if there were any other mountains on the south side of the mountains of the Abessinian plateau higher than or even as high as themselves, the rain of the S.W. monsoon would in like manner never reach them, or at most reach them with its force much modified; but the contrary of each of these conclusions is the fact: wherefore it follows that the Abessinian plateau constitutes the highest land in Africa within the influence of the S.W. monsoon; and it would be just, on this ground alone, to infer that the large tributaries to the White Nile, which are known to flow from the southern part of the Abessinian plateau, where its mountains are by positive testimony likewise highest, are the true sources of the main stream.

If we are to concede, with M. d'Arnaud that the Saubat, joining the White Nile from the E. in  $9^{\circ} 17' N.$  and  $29^{\circ} 7' E.$ , brings nearly half the volume of waters to its stream; the Misselad, joining it from the W. in  $9^{\circ} 11' N.$  and  $30^{\circ} 34' E.$ , a large volume of water; and the Shooa-berri, coming from Inarya, a considerable portion likewise; there would not appear to be a sufficient volume of water left to be accounted for to raise the presumption that the main stream can yet come from the S. The Shooa-berri itself, in the map which accompanies M. d'Arnaud's paper, is made to be the upper course of the White Nile.

Assuming, however, that the main stream of the White Nile does come from a part of Africa near its eastern coast, to the S. of the 2nd degree of S. latitude, let us see what are the concurrent circumstances involved in such an assumption.

The mouths of Damietta and Rosetta of the Nile are in  $31\frac{1}{2}^{\circ}$  of N. lat., and, supposing its source to be one degree and a half to the S. of  $2^{\circ} S.$ , the course of the river, in latitude alone, would extend over 35 degrees; and, allowing for variation of longitude and tortuousness of the stream, its actual course would not be less than a distance equivalent to 45 degrees of latitude, that is, than 2700 geographical miles.

No sufficient estimate of the elevation of the source of a river can be deduced from the inclination of its bed, as measured between any two or more points in its lower course, in consequence of that inclination increasing in an irregular, though generally accelerated ratio, as the source is approached; but by confining such a calculation within the limits of observed data, we may obtain a result for the elevation of its source, than which the true elevation cannot be less.

Keeping this principle in view, we have, in the case of the White Nile, the following data from which to calculate the inclination for the first half of its course, of its bed, and approximate elevation of its source.

In the delta, between the Mediterranean and Kahireh, a dis-

tance by the Rosetta branch of about 120,000 toises, equivalent to 234,000 mètres, or rather more than 2 geographical degrees, the inclination of the stream will of course vary with the height at Kahireh of the surface of the river, which ranges from 13·246 mètres (= 43·458 ft. Eng.) on occasions of high Nile, to about 5 mètres (= 16·404 ft. Eng.) when the flood has subsided, above the level of the sea in the Mediterranean (M. G. Le Père, *Observations sur le Profil de Nivellement de la Vallée du Nil*; Description, &c., tome xviii. 2<sup>e</sup> partie, p. 88), and may be taken at the latter period, when the height of the water is stationary at its minimum, at about 2 inches (= 2·13155 ins. Eng.) in 1000 toises (= 76735 ins. Eng.), equal to  $\frac{1}{36000}$  (M. Le Père aîné, *Mém. sur la Vallée du Nil*, &c., tome xviii. 1<sup>e</sup> partie, p. 566).

According to the observation of M. Caillaud (*Voyage à Méroë*, vol. iv. p. 74), the mean altitude of the mercury in the barometer at Assouan, on the mornings of the 23rd and 24th of November was 755 millimètres (= 29·725 ins. Eng.) at a temperature of 62°·6 Fahr., and the mean morning altitude for the 9th of November at Kahireh (M. Coutelle, *Observations Météorologiques*; Description, &c., tome xix., p. 454) is 763·6 millimètres (= 30·0537 ins. Eng.) at 59°·45 Fahr., which would make Assouan about 95·705 mètres (= 313·86 ft. Eng.) above Kahireh. The distance between the two places by the river, measured on the large French map, is about 200 leagues, equal to 8 geographical degrees or 888,889 mètres. The inclination, therefore, of the river between them will be expressed by  $\frac{95\cdot705}{888889} = \frac{1}{9287}$  or in even numbers by  $\frac{1}{9000}$ .

The next place, of the altitude of which we have any distinct notice, is Senaar, on the Blue Nile, about 120 miles above its junction with the White, and situated in 13° 37' N., and being 10° 27 $\frac{3}{4}$ ' to the S. of Assouan, and, by the course of the river, about 13 $\frac{1}{2}$  degrees, equal to 1,500,000 mètres, distant from it. Bruce assigns to the plateau of Senaar an altitude of 4000 feet, equal to 1220 mètres above the sea, in which he is supported by the opinions of Rennell and Humboldt (Ritter, *Geogr.*, vol. ii. p. 251). Then since the stream of the White Nile was found upon examination by M. Caillaud to be much more rapid than the stream of the Blue Nile, and its volume of water half as large again (vol. ii. p. 201), we are justified in assuming that the point in the White Nile corresponding, in distance from the junction, to Senaar on the Blue, will be at least as high as Senaar, that is, 1220 mètres above the sea. If from this quantity we deduct 110 mètres for the altitude of Assouan above the sea, there will remain 1110 mètres for the rise of the bed of the White Nile in the 13 $\frac{1}{2}$  degrees, or 1,500,000 mètres, of its course next above Assouan, which will give a rate of inclination of  $\frac{1}{1360}$ ; and, supposing only

this rate of inclination to be continued for the remaining  $21\frac{1}{2}$  degrees, equal to 2,388,891 mètres, of the river's assumed course, the further elevation attained through that space would be 1756 mètres, equal to 5760 feet English; to which if 4000 feet, the altitude of Senaar, be added, the result of 9760 feet would express the elevation of the source of the White Nile above the sea. That such an amount of elevation is within the truth we have the corroborative fact by Bruce that the source of the lesser river, the Blue Nile, is from 9000 to 10,000 feet above the sea.

Before proceeding to make further use of this result, however, in order to meet any objection which may be urged of the altitude of 4000 feet for Senaar, and for the corresponding point on the White Nile, being too great, let us take this altitude at one-half only, or 2000 feet, equal to 610 mètres, from which, if the 110 mètres for the altitude of Assouan be deducted, there will remain 500 mètres, and the inclination of the river will become  $\frac{1}{3000}$ , which inclination, we will suppose, as before, not to be exceeded in the remaining  $21\frac{1}{2}$  degrees, or 238,891 mètres, of the course; we shall then have an altitude through that space of  $\frac{238891}{3000} = 796\frac{1}{4}$  mètres, or 2612 feet English; to which if the assumed altitude for the point corresponding to Senaar, of 2000 feet, be added, we shall have for the elevation of the sources of the White Nile above the sea 4612 feet. But as the primary streams constituting the sources run in valleys, and are, by hypothesis, supposed to collect a considerable drainage within the tropics, they must be accompanied by mountains of additional height above them; and we may fairly assume, from the foregoing data, the general height of the mountains where the Nile rises to be not less than 6500 feet above the sea.

That tropical mountains of such an altitude, when exposed to the moist winds from seaward, are sufficient to cause in abundance the periodical rain incidental to mountainous regions within the tropics, is, I think, proved by the occurrence, during the S.W. monsoon, of heavy rains on the west coast of India, where the Syhadree range, running parallel to the coast, and not on an average more than 5000 feet high, has been known to produce on its immediate ridge 280 inches of rain in the year.\* Consequently it would follow, if the upper course of the Nile took a direction, as Dr. Beke would maintain, to the country of Mono Moezi, situate to the S. of the line, near the E. coast of Africa, that the mountains about its source would produce heavy and continued falls of rain as the sun became vertical to them, which would cause an accession of waters to the Nile at some time between the autumnal and vernal equi-

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\* This result was indicated by a rain-gauge kept upon the Mahabuleshwar range, and was communicated to the author on the spot.



noxes. But we know that such is not the case, since the Nile does not begin to rise in Egypt till the end of June, which is about six weeks after the regular setting in of the rains in Abessinia. If the White Nile received an accession of waters shortly before or at the time of the vernal equinox, a rise in the river at Kahireh might be expected in May. But so rare are the instances when a rise of the Nile has been observed at Kahireh in May, that its occurrence is regarded as a phenomenon (M. Jomard, *Bulletin de la Société Géographique*, Feb. 1844, note, p. 138), and may be accounted for on the supposition that the light showers which prevail in Abessinia through February, March, and April have been heavier than usual.

According to Bruce (vol. iii. p. 745, *et seq.*, ed. 4to.), the aggregate quantity of rain falling at Gondar, during the three last-mentioned months, or rather during February and March, for scarcely one-tenth of an inch falls in April, does not exceed one inch; and it would appear to be brought to Abessinia by a continuation of the north-eastern monsoon (Horsburg, *Directory*, &c., vol. i. pp. iv., 125, 251, ed. 1826), which takes a direction from the Indian Ocean towards this part of the continent of Africa during the southern declination of the sun. The E.S.E. winds which prevail till March off the E. coast of Africa, may also contribute to the same result. If these spring rains in Abessinia are heavier than usual, they may produce a premature rise of the Nile, as was observed at Kahireh in 1843, when a small increase of the waters occurred as early as February, and again in May and June (M. Jomard, *Bulletin de la Société Géographique*, February, 1844, p. 138). Had this increase been due to the periodical rains falling to the S. of the equinoctial line, the effect upon the river would have been more regular, and of perennial occurrence; whereas the irregularity which characterised the premature rise in 1843, is just what might have been expected to result from the irregular rain which prevails in Abessinia in the spring of the year, having fallen at intervals more plentifully than usual.

The preceding arguments, from meteorological and hydrographical data, to show the probability of the White Nile being wholly confined to the N. of the line, and being mainly dependent upon the southern regions of the Abessinian plateau for its waters, have been adduced as aids, in the absence of that certain knowledge of the physical configuration of the country which would enable us to dispense with them. Such knowledge as we have of this configuration I shall now examine, and it will be found, as far as it goes, to conduce to the same conclusion.

In a former paragraph I traced the range on the N.E. side of Africa to the neighbourhood of the Gulf of Aden, where its elevation was said greatly to have increased. This increase is concur-

rent with the increase of elevation of the whole southern part of the Abessinian plateau, of which the range in question constitutes the boundary towards the sea-coast, With that boundary it turns round to the S. After thus turning to the S. it throws out considerable sub-ranges, which extend quite to the water's edge, where they terminate in a succession of precipices for some degrees southward from Cape Gardafoon. From the southern part of the Abessinian plateau the range would still appear to be continued southerly, though at a greater distance from the eastern coast, and so as to cause the rivers on the one side to flow into the Indian Ocean, and those on the other into the Atlantic. Thus, on the eastern side of this anticlinal ridge, to name the principal rivers, we have the Wäbe, the Gibe (of the E. coast), the Qelemánsi, and the Cuama, or Zambezi, and, on the western, the Zaire, the Coanga, the Cuánene, &c. If our glance be now extended to the whole river-system of Africa, it will be perceived that the great drainage of the continent is towards the Atlantic and Mediterranean. The rivers which fall into the Atlantic, it is not necessary for our present purpose to notice. But the drainage which finds an outlet by the Nile to the Mediterranean would appear to be of that large region which lies to the E. of the high land continued southerly from the eastern flank of the Atlas, until it finds a connection through the interior of the continent, by the W. of Borgou and Darfour (Ritter, *Geogr. &c.*, vol. ii. p. 251), with the secondary ranges running out to the W. from some point in the range above described to be parallel to the eastern coast.

That a range running E. and W., near the eastern coast, does exist, we have the concurrent opinions of all geographers from the time of Ptolemy to the present day. The question is, how is it connected with the range which sends its waters to the eastern coast? In 1613 the Jesuit missionary, Antonio Fernandez (Ritter, *Geogr. &c.*, vol. i. p. 256), when proceeding on his way from Gondar to the eastern coast, on a mission from the king Segued of Abessinia to Pope Paul V. and Philip III. of Spain and Portugal, came to the northern mountains of Inarya in 8 days after crossing the Blue Nile, and, after traversing Inarya for 11 days, descended a high mountain and reached the Gibe, which falls into the Indian Ocean. The second mountain was undoubtedly part of the range which separates the rivers of the Indian Ocean from the waters of the White Nile.

Browne (*Travels in Africa*, p. 473) states, upon native information in Darfour, that at 10 days' journey to the S. of Abú Telfian, which in his map he places in about lat. 13° N. and long. 25° 20' E. of Greenwich, is a range of mountains running E. and W., in which the White Nile is said to rise, called Koumri, and placed in his map in about 8° N. and between

23° and 28° E. He also states that the whole country, from Abú Telfian to the Koumri range, is very mountainous.

Whether the mountains here named Koumri are in reality part of Inarya, and not sufficiently extended to the E. by Browne, there is not information to determine; but, from the general vagueness of native information in Africa, and the difficulty, if not impossibility, of accurately estimating, from the assumed direction of successive marches, the relative bearings of places several hundred miles apart, such a supposition is not inconsistent. We have, however, the evidence of Browne to a mountainous range connected with the high land to the S. of Darfour, and extending from 13° N. along the direction of the 25th meridian to 8° N., and thence turning round to the E. and stretching as far as 28° E.

M. d'Arnaud (*Bulletin de la Société Géographique*, February, 1842, p. 94) testifies that large chains of mountains close upon the White Nile on both sides, in 4° 42' 42" N. and 31° 28' E. (of Greenwich), where his expedition was stopped for want of water in the river at the season of his being there. He also states that the river still continues from that point for a further 30 leagues S., when several branches unite, the principal one of which comes from the E. There our information ends.

Upon these statements it is to be observed, that, as the Nile constitutes the principal valley of the region, which is admitted by all accounts to be very mountainous, it is probable that it is attended with a continuous system of mountains in its whole course through this region; and, that were there an opening through these mountains to the S., or were the Koumri mountains of Browne reflected at their eastern extremity into a southern course so as to become connected with the range of the eastern coast to the southward of the line, the magnitude of the tributary stream to the White Nile, to which the eastern slope of the continuation of the Koumri and the western slope of the coast range would give rise, would be such as not to have left M. d'Arnaud uninformed of its relative importance; whereas the effect of the information which he acquired proved, in his opinion, that the main stream came from the E.

The range from Abú Telfian may possibly trend irregularly round to the E. until its continuation is confounded with the western of the chains through which the river passes in 4° 42' 42" N. (*Bulletin*, &c., February, 1843, pp. 94, 96), and, having so become identical with that chain, may thence follow the outer tributaries of the White Nile until it unites with the range crossed by Fernandez, which forms the extreme southern ridge of the Abessinian plateau, and separates the waters of the White Nile from those which fall into the eastern ocean. The mountainous chain on the E. bank of the river, in the same latitude, may also be an offshoot

system from the western part of the northern crest of Inarya, which separates the waters of the Blue from those of the White Nile.

I have now given the reasons which have occurred to me for concluding, with M. d'Abbadie, that the White Nile owes its sources to Inarya and Kaffa rather than to a region S. of the equinoctial line. They are of course speculative to the extent that our knowledge of the facts connected with the geography of the White Nile is uncertain. Various, indeed, have been the aspects which this geography has been made to assume. The course of the White Nile stretched by Pomponius Mela and Pliny through the medium of the Niger to the very back of the Atlas, was by Ptolemy brought within more eastern and definite limits. By D'Anville, after a lapse of 16 centuries, the limits assigned by Ptolemy were again curtailed. By Browne and by Rennell a yet more distinct course was proposed : and while the latest writers, including MM. Jomard, D'Avezac, and Ritter, who, with Africa, have made the Nile their peculiar study, discover their opinions to be shaken on the side of the W., they withhold a precise destination for them towards the E. ; thinking, perhaps, with the caution which so many changes have suggested, that the question for its final solution awaits the fuller research which shall fill up the gap subsisting between the observations of M. d'Abbadie and the termination of the journey of M. d'Arnaud.

[*The following Note is inserted for the purpose of correcting some inaccuracies in the Papers by the Messrs. Gregory and Lieut. Helpman.—ED.*]

NOTE on the identity of certain rivers and hills on the west coast of Australia, between the parallels of 28° and 30° south latitude, which have been differently laid down by Capts. King, Grey, Stokes ; Lieuts. Roe and Helpman, and the Messrs. Gregory.

THE names and positions of Mount Fairfax and Wizard Hill of Capt. King, admit of no change.

The names of Mount Fairfax, Wizard Hill, and Mount Hill were misapplied by Capt. Grey, who travelled over many hills of very similar appearance. Capt. Stokes and Lieut. Helpman have, by sea and land, cleared up this discrepancy very satisfactorily.

Capt. Grey's names of the rivers admit of no change, as he was the discoverer of the whole of those that flow into the sea between the above altitudes ; his distances, only, require correction.

Capt. Grey was shipwrecked in Gantheaume Bay in April, 1839,—he and his party travelled thence to Perth by land, and he named every river which he crossed, and the description which he has given of each is so clear, that no difficulty exists in identifying the whole of them with the more recent accounts of Stokes, Roe, Helpman, and the Gregor-ys.